

Type of Conduit	Wall Description	Manning's n
Concrete Pipe	Smooth Interior	0.012
Concrete Boxes	Smooth Walls	0.012-0.015
Corrugated Metal Pipes and Boxes, Annular or Helical Pipe (see HDS #5)	68 mm x 13 mm corrugations	0.024
	150 mm x 25 mm corrugations	0.024
	125 mm x 25 mm corrugations	0.024
	75 mm x 25 mm corrugations	0.024
	150 mm x 50 mm structural plate	0.033-0.035
	230 mm x 64 mm structural plate	0.033-0.037
Thermoplastic Pipes	Smooth Interior	0.012

*Note 1: The values indicated in this table are recommended Manning's "n" design values. Actual field values for older, existing pipelines may vary depending on the effects of abrasion, corrosion, deflection and joint conditions. Concrete pipes with poor joints and deteriorated walls may have "n" values of 0.014 to 0.018. Corrugated metal pipe with joint and wall problems may also have higher "n" values and, in addition, may experience shape changes which could adversely affect the general hydraulic characteristics of the culvert.*

*Note 2: For further information concerning Manning's "n" values for selected conduits, consult Hydraulic Design of Highway Culverts, Federal Highway Administration, HDS #5, p. 163.*

## **RECOMMENDED MANNING'S n VALUES**

**Figure 31-10A**